

Vectren 2016 Integrated Resource Plan (IRP)

April 7, 2016 Stakeholder Meeting 1 Summary

The following is a summary of the first of three Vectren IRP stakeholder meetings in 2016 and is meant to provide a high level overview of the discussion on April 7th. Stakeholder feedback gathered at these meetings will be considered within Vectren's evolving IRP process.

Welcome

Carl Chapman, President and Chief Executive Officer

Mr. Chapman opened the meeting and welcomed our guests to Vectren headquarters, located within Vectren's service territory in Evansville, IN. He reminded stakeholders of Vectren's commitment to continuous improvement regarding the IRP process and discussed several changes to the process based on feedback from stakeholders, including: holding a joint education session with stakeholders on February 3, 2016 to discuss the IRP process (presentations and audio files of that session can be found at www.vectren.com/irp), developing a robust risk analysis, and evaluating a wider range of resources to help serve Vectren customers in the future. Finally, Mr. Chapman discussed Vectren's commitment to developing a plan for the future that maintains reliable service, keeps customer cost as low as possible, and is environmentally acceptable. Mr. Chapman then introduced the moderator, Gary Vicinus.

Vectren IRP Process Overview (Slides 4-26)

Gary Vicinus, Pace Global – Managing Director of Consulting Practice

Mr. Vicinus discussed, in detail, Vectren's approach to the 2016 IRP. He discussed the objectives of the IRP and types of metrics that will be used to help ensure that objectives are met. Additionally, Mr. Vicinus talked about how Vectren plans to develop 5-7 scenarios. These scenarios will represent a wide range of possible futures. Vectren will model each of these future states to determine the optimal mix of resources to meet customer load for each. Vectren will develop additional portfolios of resource options for evaluation, including 1-2 developed with stakeholder input. Each will be tested against all scenarios to determine which perform well under a wide range of possible future states. Finally, these portfolios will be analyzed using probabilistic modeling in the risk analysis. Ultimately, one portfolio will be selected as the preferred plan.

Discussion of Uncertainties

Gary Vicinus, Pace Global – Managing Director of Consulting Practice

Mr. Vicinus then lead a workshop exercise to help gather stakeholder input for scenario development. The following topics were raised by stakeholders for consideration:

- Consider additional environmental regulations that have not yet been proposed
- Factor in the Clean Power Plan (CPP) compliance costs
- Factor in specific technology costs for environmental requirements
- Review transmission technology options
- Consider how electric vehicle technology affects your plan

- Consider distributed generation risk mitigation
- Capture avoided costs with the various technologies in the assessment
- Consider diversifying generation
- Consider political/regulatory risk
- Consider Combined Heat and Power (CHP) as a potential resource
- Consider additional cogeneration being developed within the Vectren territory
- Factor in price elasticity of demand into energy and demand forecast

Long-term Energy and Demand Forecast (Slides 27-36)

Matt Rice, Vectren Manager of Market Research & Analysis

Mr. Rice discussed Vectren's long term energy and demand forecast. Demand is expected to be relatively flat over the 20 year time frame due to one large customer's adoption of customer-owned generation in 2017. Beyond 2017, Vectren demand is expected to grow at a moderate pace due to downward pressure from population growth, efficiency gains from appliances, and adoption of customer owned rooftop solar. It was noted that future utility sponsored energy efficiency programs were not netted out of the forecast; however customer owned solar generation was. Mr. Rice described the inputs to each energy and demand model that Vectren utilizes and fielded questions from the audience.

Vectren clarified that the Itron (a forecasting consultant) Statistically Adjusted End-use (SAE) framework is used for residential and commercial energy forecasting and demand forecasting. Additionally, Vectren was asked about how efficiency is incorporated into the energy and demand models. The stakeholder stated that efficiency trends are offset by increased usage of the highly efficient products. Customer behavior is included in these models through historical usage and appliance saturation trends. Stakeholders asked if Vectren's models incorporate climate change. The peak demand forecast incorporates the last 10 years of peak producing weather. The 10 year average incorporates recent weather and helps inform the peak forecast.

Customer-Owned Distributed Generation (Slides 37-47)

Michael Russo, Forecast Analyst, Itron Inc.

Mr. Russo discussed the Vectren specific customer-owned solar model used to forecast adoption of customer-owned solar within Vectren's electric territory. The model that Itron developed is based on payback period, how long it takes for energy savings to pay for the system. It incorporates declining solar system costs, federal incentives, and Vectren electric rates. The results of the forecast show that over 50 MW of solar is likely to be built within the Vectren territory over the next twenty years, which equates to a reduction of 16 MW to the Vectren peak demand forecast in 2036.

Stakeholders asked if solar costs were national or based on the Vectren service territory. National numbers were used. Itron is not aware of a source for solar system costs specific to the Evansville area; however, they are confident that these numbers are reasonable. Another stakeholder asked about the assumption on Vectren rates. It was assumed that Vectren rates would increase by about .9% per year throughout the forecast. Stakeholders had questions about why the installed capacity of more than 50 MW was not applied directly to the demand forecast.

Mr. Russo explained that the peak output for solar panels, in this case around 50 Megawatt (MW), would happen around noon, while Vectren's system peak is around 4:00 pm. By that time, residential solar output is expected to be 32% of the output at noon, based on Evansville specific NREL data.

2016 IRP Technology Assessment Generation Resource Alternatives (Slides 48-54)
Mike Borgstadt, Project Manager, Burns and McDonnell

Mr. Borgstadt discussed the technology assessment that Burns and McDonnell (an engineering company) developed for Vectren's 2016 IRP. The technology assessment describes the cost and performance characteristics of over 30 utility owned resource options, including coal, gas, renewables, and energy storage. He described how these options would be incorporated into Vectren's modeling efforts.

Mr. Borgstadt fielded questions. He discussed how most combined heat and power facilities need to be located adjacent to a thermal host to save on steam piping. One stakeholder asked about the scalability of solar and how that may be an advantage in resource planning. While scalability can be an advantage, it is cheaper per MW to build larger systems. The modeling will take this into account.

2016 IRP Technology Assessment Supplemental Studies Generation Retrofit Alternatives (Slides 55-60)
Scott Brown, Vectren Manager of Generation Planning

Mr. Brown discussed the results of retrofit alternatives for Vectren coal plants, including: conversion from coal to gas, co-firing gas and coal, conversion of gas peaking units into a combined cycle gas unit, and re-powering existing coal units into gas fired combined cycle units. Each of these options will be considered for modeling. While Vectren has enough capacity to meet peak load in the future, these options could be attractive because they could help Vectren emit less CO₂ into the atmosphere. Detailed studies were necessary for these options because they are site specific. The advantages and disadvantages of these options were discussed.

Some of the discussion that followed this presentation was around retrofitting an aging facility and if the condition of the existing equipment was considered. The condition of the facilities was taken into account for these studies. Additionally, some of these options may be screened out prior to optimization modeling based on the levelized cost of energy.

Additionally, there was some discussion to clarify the difference between conversion (bottom of slide 58) and re-powering (slide 59). Conversion is switching the fuel source from coal to gas to generate steam. With re-powering, the old boiler is removed. Two gas turbines would be built, and the waste heat from those two units is run to a heat recovering steam generator that would be used to power the existing steam turbine and run its electrical generator. It is then a combined cycle unit, which is more efficient than the conversion option.

Energy Efficiency Modeling Discussion (Slides 61-65) Shawn Kelly, Vectren Director of Energy Efficiency

Mr. Kelly began by defining energy efficiency, using less energy without impacting the level of service, and discussed Vectren's on-going commitment to energy efficiency. He discussed Vectren's history of energy efficiency programs and collaborative approach with the oversight board. He then mentioned that we recently received approval for the 2016-2017 plan, which amounts to approximately 1% of eligible sales (residential, commercial, and non-opt out large sales).

Then, Mr. Kelly gave an overview of Vectren's energy efficiency modeling assumptions. For the 2016 IRP, Vectren has not netted out any expected future level of energy efficiency plans from the sales and demand forecast. The optimization model will evaluate the amount of energy efficiency that is needed in each year of the forecast beyond what is included in the 2016-2017 plan.

A stakeholder asked if Vectren has any energy efficiency street lighting programs. Vectren mentioned the recent utilization of LED lighting at the new Hwy. 41 and Lloyd Expressway with LED lighting technology. Vectren is also working to develop an LED program to utilize LED lighting technology on new streetlights as well as replace failed street lights with LED technology for municipal street lighting customers. Mr. Kelly answered some clarifying questions on model assumptions and discussed some difference from Vectren's approach in 2016 vs. 2014. One stakeholder asked if Vectren tracks energy efficiency efforts for large customers that have opted out of Vectren programs. Vectren does not directly track this information but does provide opportunities for customers to opt back into Vectren programs. Finally, one stakeholder suggested that Vectren consider painting black roofs white as an energy efficiency program.

Stakeholder Questions, Feedback, and Comments Gary Vicinus, Pace Global – Managing Director of Consulting Practice

The final portion of the meeting was dedicated to answering any additional questions and capturing stakeholder feedback. By this point, Vectren stakeholders only had a few questions/comments. One stakeholder wanted to make sure that Vectren was factoring in the risk to coal prices, given the pressure on coal companies. Mr. Vicinus mentioned that future scenarios will be discussed at the July stakeholder meeting. Additionally there was a discussion on the ability of Vectren to finance portfolio options. Vectren assured the stakeholder that the ability to finance resource options will be considered.

Mr. Vicinus mentioned that this is the first of three stakeholder meetings. The next meeting will be held in July to discuss model inputs/assumptions followed by one in the fall to discuss the preferred portfolio.